

WHAT IS CLAIMED IS:

1. A method of deciding Internet address of a device to be specified in network connecting a plurality of devices that communicate each other by using an Internet Protocol,  
5 the method comprising the steps of:

detecting and collecting addresses of all the other devices connected to the network by receiving and analyzing signals flowing through the network; and

10 selecting an IP address, which is different from the collected addresses, from among a group of applicable IP addresses.

2. The method according to claim 1, further comprising the steps of:

15 checking whether the selected IP address matches with the IP address of any of said other devices; and  
if the selected IP address matches with the IP address of any of said other devices, repeating the step of selection of the IP address until the selected IP address does not  
20 match with the IP address of any of said other devices.

3. A method of deciding Internet address of a device to be specified in network connecting a plurality of devices that communicate each another by using an Internet Protocol,  
25 the method comprising the steps of:

detecting addresses of all the other devices connected to the network by receiving and analyzing signals flowing through the network;

selecting an IP address and a MAC address among the  
5 detected addresses to pose as a device having the IP address and the MAC address;

sending a destination signal on the network by using the address of the posed device, and collecting addresses of other devices by acquiring responses to the destination  
10 signal; and

selecting an IP address, which is different from the collected addresses, among a group of applicable IP addresses.

15 4. The method according to claim 3, which comprises collecting complete address information by selecting an IP address and a MAC address other than the IP address and the MAC address of the posed device for any device that does not respond, changing the posed device until all the devices  
20 are posed, and performing the step of sending the destination signal for each of the posed devices.

5. The method according to claim 3, further comprising the steps of:

25 checking whether the selected IP address matches with

the IP address of any of said other devices; and  
if the selected IP address matches with the IP address  
of any of said other devices, repeating the step of selection  
of the IP address until the selected IP address does not  
5 match with the IP address of any of said other devices.

6. A method of selecting an IP address that does not  
overlap with other addresses among the effective range  
permitted as IP address, the method comprises the steps of:  
10 detecting and collecting addresses of all the other  
devices connected to the network by receiving and analyzing  
signals flowing through the network;  
sectioning binary numerals of the collected IP address  
at Nth bit ( $1 \leq N \leq K$ , K is a predetermined natural number)  
15 from a minimum digit, and defining digits not less than the  
Nth bit as high rank bits and digits lower than Nth bit as  
low rank bits;  
judging whether all of the high rank bits of the  
collected IP addresses are same;  
20 if all of the high rank bits are not same, changing  
N to N+1, N-1, or to a desired number, and sectioning the  
binary numerals in the step of sectioning to make the judgment  
at the judgment step;  
repeating the number changing step until all of the  
25 high rank bits become same;

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if all of the high rank bits are same, adopting a value expressed by binary number composed of the same high rank bits and low rank bits set all 0 as IP network address, and adopting a value expressed by binary number composed of high rank bits set all 1 and low rank bits set all 0 as subnet mask; and

5        selecting an IP address, which is different from the IP address of any the other device connected to the network, from among a group of effective IP addresses defined by the 10      IP network address and the subnet mask.

7.        A method of searching and collecting all the addresses already being used in an environment where all packets flowing through network connected by using connecting means 15      such as switching hub and bridge cannot be observed, the method comprising the steps of:

selecting an address other than already posed address to pose that address;

20        sending a destination signal on network to any device having IP address that does not respond by using the IP address of the posed device, and collecting address of other devices by acquiring responses to the destination signal; and

repeating the selection of the address and sending of the destination signal until the address that is not posed 25      does not exist.

8. A method of limiting address range to be searched in an environment where a wide address space is used, the method comprising the steps of:

restricting address in the range to be searched by  
5 using a net mask that has a suitable value; and

repeating search of the address range with use of the net mask of smaller value if all matters to be searched are detected.

10 9. A method for automatically deciding a value of Internet address that is not overlapped in an environment where a plurality of similar IP address deciding devices are used, the method comprising the steps of:

selecting an IP address that is intended to use and  
15 its own MAC address;

sending an address resolution request packet using the selected IP address as of transmitter and as requested address;

observing for a predetermined period of time whether  
20 or not an address resolution request packet including the identical IP address used as of transmitter and as requested address and a MAC address different from its own MAC address is sent;

when the address resolution request packet is not  
25 observed then setting the IP address as its own IP address

of the device to finish the operation, and when the address resolution request packet is observed then judging whether the MAC address included in the packet is smaller than its own MAC address; and

5           when the MAC address is smaller than its own MAC address then setting the IP address as its own IP address to finish the operation, when the MAC address is not smaller than its own MAC address then selecting another IP address that is intended to use.

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10.       A computer readable medium for storing instructions, which when executed on a computer, causes the computer to perform a method of deciding Internet address of a device to be specified in network connecting a plurality of devices  
15       that communicate each other by using an Internet Protocol, the method comprising the steps of:

detecting and collecting addresses of all the other devices connected to the network by receiving and analyzing signals flowing through the network; and

20       selecting an IP address, which is different from the collected addresses, from among a group of applicable IP addresses

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11. A computer readable medium for storing instructions, which when executed on a computer, causes the computer to perform a method of deciding Internet address of a device to be specified in network connecting a plurality of devices  
5 that communicate each another by using an Internet Protocol, the method comprising the steps of:

detecting addresses of all the other devices connected to the network by receiving and analyzing signals flowing through the network;

10       selecting an IP address and a MAC address among the detected addresses to pose as a device having the IP address and the MAC address;

sending a destination signal on the network by using the address of the posed device, and collecting addresses  
15 of other devices by acquiring responses to the destination signal; and

selecting an IP address, which is different from the collected addresses, among a group of applicable IP addresses.

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12. A computer readable medium for storing instructions, which when executed on a computer, causes the computer to perform a method of selecting an IP address that does not overlap with other addresses among the effective range  
25 permitted as IP address, the method comprises the steps of:

detecting and collecting addresses of all the other devices connected to the network by receiving and analyzing signals flowing through the network;

sectioning binary numerals of the collected IP address  
5 at Nth bit ( $1 \leq N \leq K$ , K is a predetermined natural number) from a minimum digit, and defining digits not less than the Nth bit as high rank bits and digits lower than Nth bit as low rank bits;

judging whether all of the high rank bits of the  
10 collected IP addresses are same;

if all of the high rank bits are not same, changing N to N+1, N-1, or to a desired number, and sectioning the binary numerals in the step of sectioning to make the judgment at the judgment step;

15 repeating the number changing step until all of the high rank bits become same;

if all of the high rank bits are same, adopting a value expressed by binary number composed of the same high rank bits and low rank bits set all 0 as IP network address, and  
20 adopting a value expressed by binary number composed of high rank bits set all 1 and low rank bits set all 0 as subnet mask; and

selecting an IP address, which is different from the IP address of any the other device connected to the network,  
25 from among a group of effective IP addresses defined by the

IP network address and the subnet mask.

13. A computer readable medium for storing instructions,  
which when executed on a computer, causes the computer to  
5 perform a method of searching and collecting all the  
addresses already being used in an environment where all  
packets flowing through network connected by using  
connecting means such as switching hub and bridge cannot  
be observed, the method comprising the steps of:

10 selecting an address other than already posed address  
to pose that address;

sending a destination signal on network to any device  
having IP address that does not respond by using the IP address  
of the posed device, and collecting address of other devices  
15 by acquiring responses to the destination signal; and

repeating the selection of the address and sending  
of the destination signal until the address that is not posed  
does not exist.

20 14. A computer readable medium for storing instructions,  
which when executed on a computer, causes the computer to  
perform a method of limiting address range to be searched  
in an environment where a wide address space is used, the  
method comprising the steps of:

25 restricting address in the range to be searched by

using a net mask that has a suitable value; and  
repeating search of the address range with use of the  
net mask of smaller value if all matters to be searched are  
detected.

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15. A computer readable medium for storing instructions,  
which when executed on a computer, causes the computer to  
perform a method for automatically deciding a value of  
Internet address that is not overlapped in an environment  
10 where a plurality of similar IP address deciding devices  
are used, the method comprising the steps of:

selecting an IP address that is intended to use and  
its own MAC address;

15 sending an address resolution request packet using  
the selected IP address as of transmitter and as requested  
address;

20 observing for a predetermined period of time whether  
or not an address resolution request packet including the  
identical IP address used as of transmitter and as requested  
address and a MAC address different from its own MAC address  
is sent;

when the address resolution request packet is not  
observed then setting the IP address as its own IP address  
of the device to finish the operation, and when the address  
25 resolution request packet is observed then judging whether

the MAC address included in the packet is smaller than its own MAC address; and

when the MAC address is smaller than its own MAC address then setting the IP address as its own IP address to finish  
5 the operation, when the MAC address is not smaller than its own MAC address then selecting another IP address that is intended to use.

16. A device for deciding Internet address of a device  
10 to be specified in network connecting a plurality of devices that communicate to each other by using an Internet Protocol, the device comprising:

detecting and collecting unit which detects and collects addresses of all the other devices connected to  
15 the network by receiving and analyzing signals flowing through the network; and

address selecting unit which selects an IP address, which is different from the collected addresses, from among a group of applicable IP addresses.

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17. The Internet address deciding device according to claim 16, wherein said address selecting unit checks whether the selected IP address matches with the IP address of any of said other devices, and if the selected IP address matches  
25 with the IP address of any of said other devices then repeats

the selection of the IP address until the selected IP address does not match with the IP address of any of said other devices.

18. A computer program for causing the computer to perform  
5 a method of deciding Internet address of a device to be specified in network connecting a plurality of devices that communicate each other by using an Internet Protocol, the method comprising the steps of:

detecting and collecting addresses of all the other  
10 devices connected to the network by receiving and analyzing signals flowing through the network; and

selecting an IP address, which is different from the collected addresses, from among a group of applicable IP addresses

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19. A computer program for causing the computer to perform a method of deciding Internet address of a device to be specified in network connecting a plurality of devices that communicate each another by using an Internet Protocol, the  
20 method comprising the steps of:

detecting addresses of all the other devices connected to the network by receiving and analyzing signals flowing through the network;

selecting an IP address and a MAC address among the  
25 detected addresses to pose as a device having the IP address

and the MAC address;

sending a destination signal on the network by using the address of the posed device, and collecting addresses of other devices by acquiring responses to the destination  
5 signal; and

selecting an IP address, which is different from the collected addresses, among a group of applicable IP addresses.

10 20. A computer program for causing the computer to perform a method of selecting an IP address that does not overlap with other addresses among the effective range permitted as IP address, the method comprises the steps of:

detecting and collecting addresses of all the other  
15 devices connected to the network by receiving and analyzing signals flowing through the network;

sectioning binary numerals of the collected IP address at Nth bit ( $1 \leq N \leq K$ , K is a predetermined natural number) from a minimum digit, and defining digits not less than the  
20 Nth bit as high rank bits and digits lower than Nth bit as low rank bits;

judging whether all of the high rank bits of the collected IP addresses are same;

if all of the high rank bits are not same, changing  
25 N to N+1, N-1, or to a desired number, and sectioning the

binary numerals in the step of sectioning to make the judgment at the judgment step;

repeating the number changing step until all of the high rank bits become same;

5       if all of the high rank bits are same, adopting a value expressed by binary number composed of the same high rank bits and low rank bits set all 0 as IP network address, and adopting a value expressed by binary number composed of high rank bits set all 1 and low rank bits set all 0 as subnet

10 mask; and

selecting an IP address, which is different from the IP address of any the other device connected to the network, from among a group of effective IP addresses defined by the IP network address and the subnet mask.

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21. A computer program for causing the computer to perform a method of searching and collecting all the addresses already being used in an environment where all packets flowing through network connected by using connecting means such as switching hub and bridge cannot be observed, the 20 method comprising the steps of:

selecting an address other than already posed address to pose that address;

sending a destination signal on network to any device 25 having IP address that does not respond by using the IP address

of the posed device, and collecting address of other devices by acquiring responses to the destination signal; and  
repeating the selection of the address and sending of the destination signal until the address that is not posed  
5 does not exist.

22. A computer program for causing the computer to perform a method of limiting address range to be searched in an environment where a wide address space is used, the method  
10 comprising the steps of:

restricting address in the range to be searched by using a net mask that has a suitable value; and

repeating search of the address range with use of the net mask of smaller value if all matters to be searched are  
15 detected.

23. A computer program for causing the computer to perform a method for automatically deciding a value of Internet address that is not overlapped in an environment where a plurality of similar IP address deciding devices are used,  
20 the method comprising the steps of:

selecting an IP address that is intended to use and its own MAC address;

sending an address resolution request packet using  
25 the selected IP address as of transmitter and as requested

address;

observing for a predetermined period of time whether or not an address resolution request packet including the identical IP address used as of transmitter and as requested 5 address and a MAC address different from its own MAC address is sent;

when the address resolution request packet is not observed then setting the IP address as its own IP address of the device to finish the operation, and when the address 10 resolution request packet is observed then judging whether the MAC address included in the packet is smaller than its own MAC address; and

when the MAC address is smaller than its own MAC address then setting the IP address as its own IP address to finish 15 the operation, when the MAC address is not smaller than its own MAC address then selecting another IP address that is intended to use.